NEW PROCEDURES AND CONCEPTS IN STRUCTURAL DESIGN '08

INDOT-APPROVED CONCEPTS

INDOT–Approved Concepts

- AASHTO Load Resistance Factor Design (LRFD) on LPA Bridge
- Historic-Bridge Program Update

INDOT–Approved Concepts

- Patching Non-Deck Concrete
- Standard Specifications for 3- and 4-Sided Structures

INDOT–Approved Concepts

- Design Manual Part VI, Structural Design, English Units
- Bridge Load-Rating Analysis

LRFD AFFECTS ON LPA BRIDGE

LRFD Affects on LPA Bridges

- Design Memorandum 08-01 indicates that each bridge on a State or local route must be designed in accordance with LRFD.

LRFD Affects on LPA Bridges

- For a PDP project, this is effective for the Stage 2 submission.

LRFD Affects on LPA Bridges

- For a non-PDP project, this is effective with design approval on or after March 18, 2008.

HISTORIC-BRIDGE PROGRAM UPDATE

Historic-Bridge Program Update

- A policy for treating a historic bridge on a route with design-year AADT ≤ 400 appears as Design Manual Part VI, Section 72-7.0.

Historic-Bridge Program Update

- The policy defines a historic bridge, and whether it is to be deemed Select, or Non-Select.

Historic-Bridge Program Update

- A policy for treating a historic bridge on a route with design-year AADT > 400 is still in development. Completion time is uncertain.

PATCHING NON-DECK CONCRETE

Patching Non-Deck Concrete

- Repointing Masonry no longer applies to this work.
- A new pay item now does.

Patching Non-Deck Concrete

- It is Patching Concrete Structures.
- Std. Spec. 710 has been rewritten to indicate this.

Patching Non-Deck Concrete

- **WHEN EFFECTIVE ?**
- **INDOT letting of Sept. 6, 2007, as a new recurring special provision.**

Patching Non-Deck Concrete

- **WHEN EFFECTIVE ?**
- **The RSP will be incorporated into the next Standard Specifications book, likely dated 2010.**

STANDARD SPECIFICATIONS FOR 3- AND 4-SIDED STRUCTURES

3- and 4-Sided Structures

Std. Spec. 723 has been added, which combines all relevant recurring special provisions requirements.

3- and 4-Sided Structures

Sec. 723 now consists of a revised recurring special provision which supersedes all related extant recurrings.

3- and 4-Sided Structures

If a 3-sided structure of 12’ ≤ Span ≤ 20’ is specified, the contractor may substitute a 4-sided structure.

3- and 4-Sided Structures

The 4-sided structure must be hydraulically equivalent to the 3-sided structure.

3- and 4-Sided Structures

The 4-sided structure must complement the roadway geometrics for the 3-sided structure.

3- and 4-Sided Structures

The 4-sided structure will be quantified as the specified 3-sided structure.

3- and 4-Sided Structures

Only the information for the 3-sided structure is to be shown on the plans.

3- and 4-Sided Structures

- **WHEN EFFECTIVE ?**
- **INDOT letting of Sept. 6, 2007, as a revised recurring special provision.**

3- and 4-Sided Structures

- **WHEN EFFECTIVE ?**
- **The RSP will be incorporated into the next Standard Specifications book, likely dated 2010.**

DESIGN MANUAL PT. VI, STRUCTURAL DESIGN, ENGLISH UNITS

Part VI, English Units

- The same firm which developed the metric-units version has completed most of an english-units version.

Part VI, English Units

- Only the Chapter 63, Prestressed Concrete, microstation figures, are still unfinished.

Part VI, English Units

All other available chapters and figures now available in metric units have been electronically finalized in english units.

Part VI, English Units

The version has been placed onto the INDOT website.

Part VI, English Units

So now, once you are in Design Manual, English Units, Part VI actually indicates something that you can click on.

Part VI, English Units

- A hardcopy version will be developed for issue in 2008. We are still not certain as to exactly when it will be available.

BRIDGE LOAD-RATING ANALYSIS

Bridge Load-Rating Analysis

- Design Memorandum 08-04 indicates that a submission to obtain such an analysis is required.

Bridge Load-Rating Analysis

- This applies to a new or replacement bridge, or to a bridge to be rehabilitated.

Bridge Load-Rating Analysis

- This applies if the bridge carries a State or local-agency route.

Bridge Load-Rating Analysis

- The procedure described in Design Memo 08-04 has been incorporated into the Design Manual.

Bridge Load-Rating Analysis

- For a PDP project, this is Part II, PDP Chapter 14, Section 14-2.04(08) item 13; and Section 14-2.05(04).

Bridge Load-Rating Analysis

- For a non-PDP project, this is Part II, non-PDP Chapter 14, Section 14-2.03(07) item 9; and Section 14-2.04(04).

CONCEPTS PENDING INDOT APPROVAL

Concepts Pending INDOT Approval

- Semi-Integral End Bents
- Standardized Bearing Devices for All Types of Structural Members
- New Prestressed-Concrete Bulb-Tee Sections

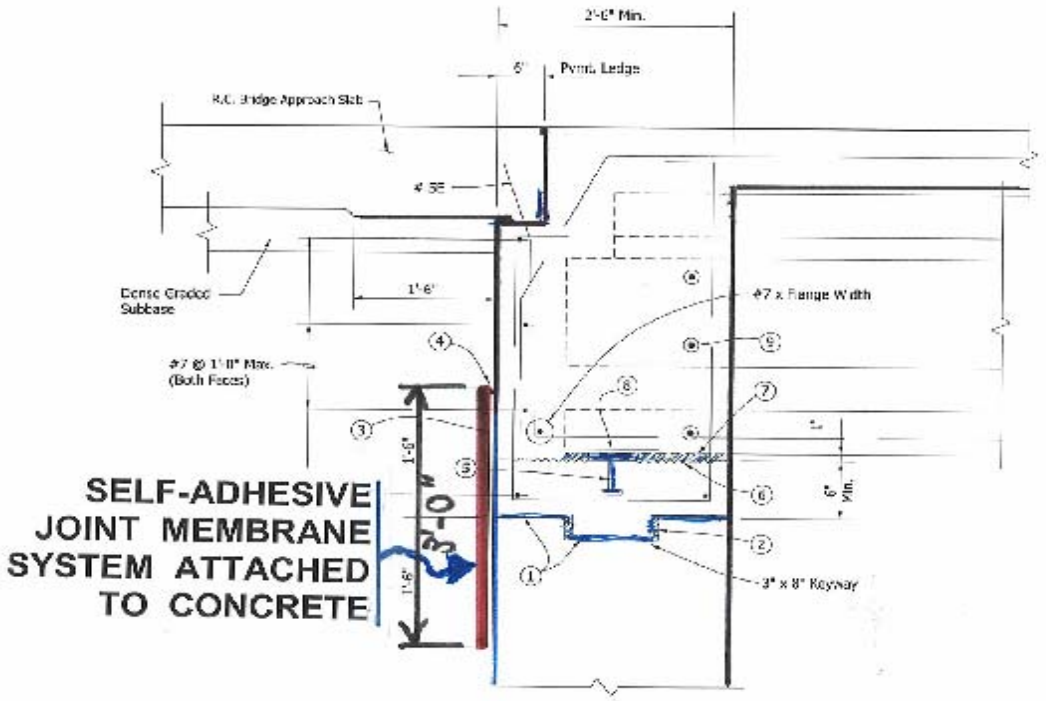
SEMI-INTEGRAL END BENTS

Semi-Integral End Bents

- This concept was reviewed by the INDOT Standards Committee. They determined that one more-thoroughly-explained material requirement was necessary.

Semi-Integral End Bents

It is the material required as shown in the detail.



SUGGESTED SEMI-INTEGRAL END-BENT DETAILS

DRAFT IDM FIGURE 67-1C(1)

Semi-Integral End Bents

- The material's concerns have been addressed by the INDOT Office of Materials Management.

Semi-Integral End Bents

- Once INDOT Structural Services completes its review of Materials Management's work, the concept will be resubmitted for INDOT Standards Committee approval.

Semi-Integral End Bents

- The Standards Committee will have sufficient information to be able to approve the concept, ideally in spring 2008.

STANDARDIZED BEARING DEVICES FOR ALL TYPES OF STRUCTURAL MEMBERS

Standardized Bearing Devices

- Currently, only the bearing pads for prestressed-concrete I-beams and box beams are now standardized.

Standardized Bearing Devices

- This proposal also standardizes bearing devices for prestressed-concrete bulb-tee members and structural-steel members.

Standardized Bearing Devices

- Details and properties for newly-standardized devices, and design guidance for such, have been drafted.

Standardized Bearing Devices

- We are now in process with determining the 2007 AASHTO LRFD code's affects on the devices' design considerations.

Standardized Bearing Devices

- This review should be complete, such that the INDOT Standards Committee can approve the concept in spring 2008.

NEW PRESTRESSED-CONCRETE BULB-TEE SECTIONS

New Bulb-Tee Sections

- Four new sections have been recommended for consideration by the INDOT-ASCE Structural Subcommittee.

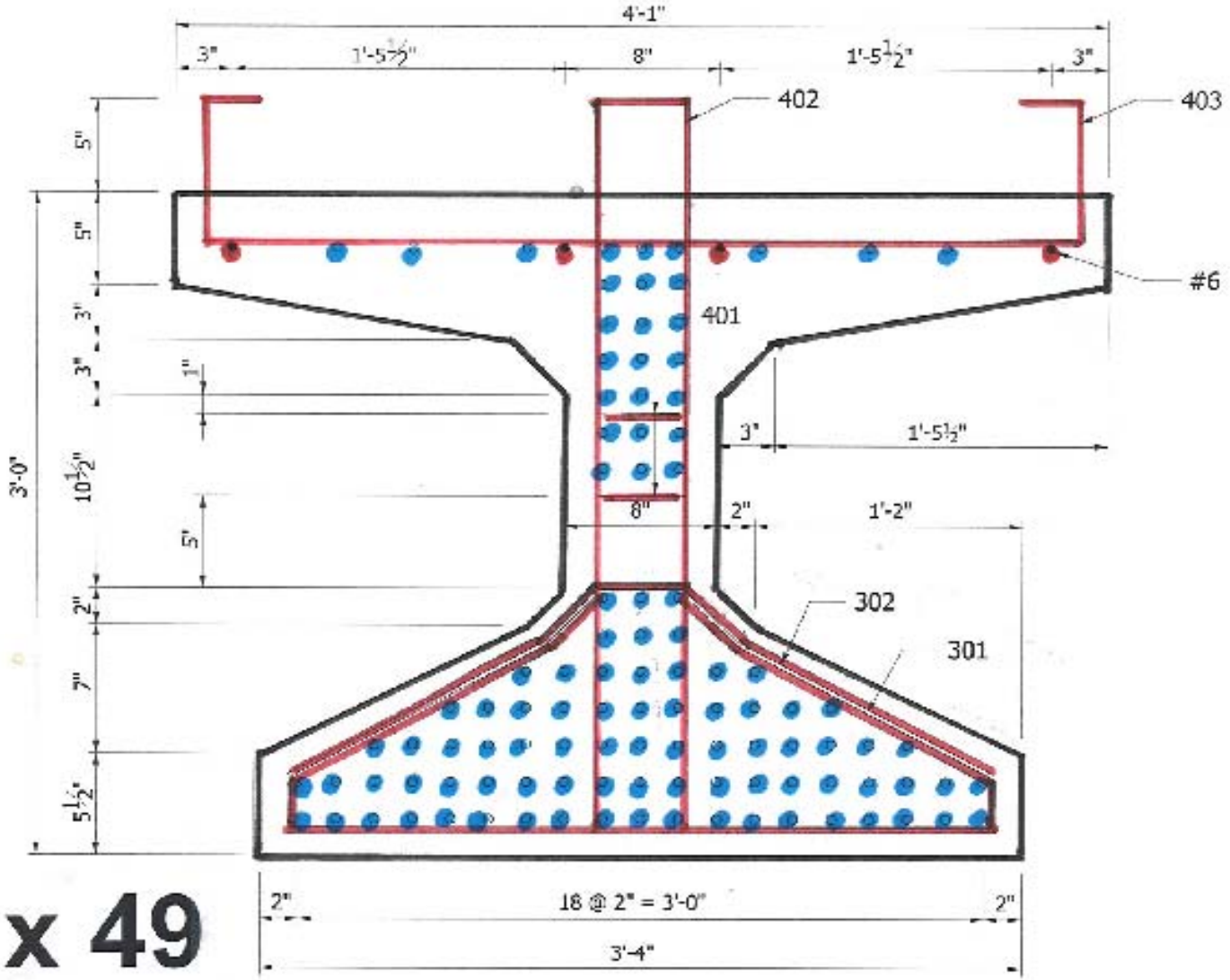
New Bulb-Tee Sections

These are (height by top-flange width, inches) as follows:

- BT 36 x 49
- BT 42 x 49
- BT 60 x 61
- BT 66 x 61

BEAM PROPERTIES
A = 879 in
I_x = 145772 in.^{4}
I_y = 102920 in.^{4}
S_{TB} = 8175.1 in.^{3}
S_{BB} = 8023.3 in.^{3}
Y_{BB} = 18.17 in.
Y_{TB} = 17.83 in.
Wt = 915 lb/ft

MILD
STRAND

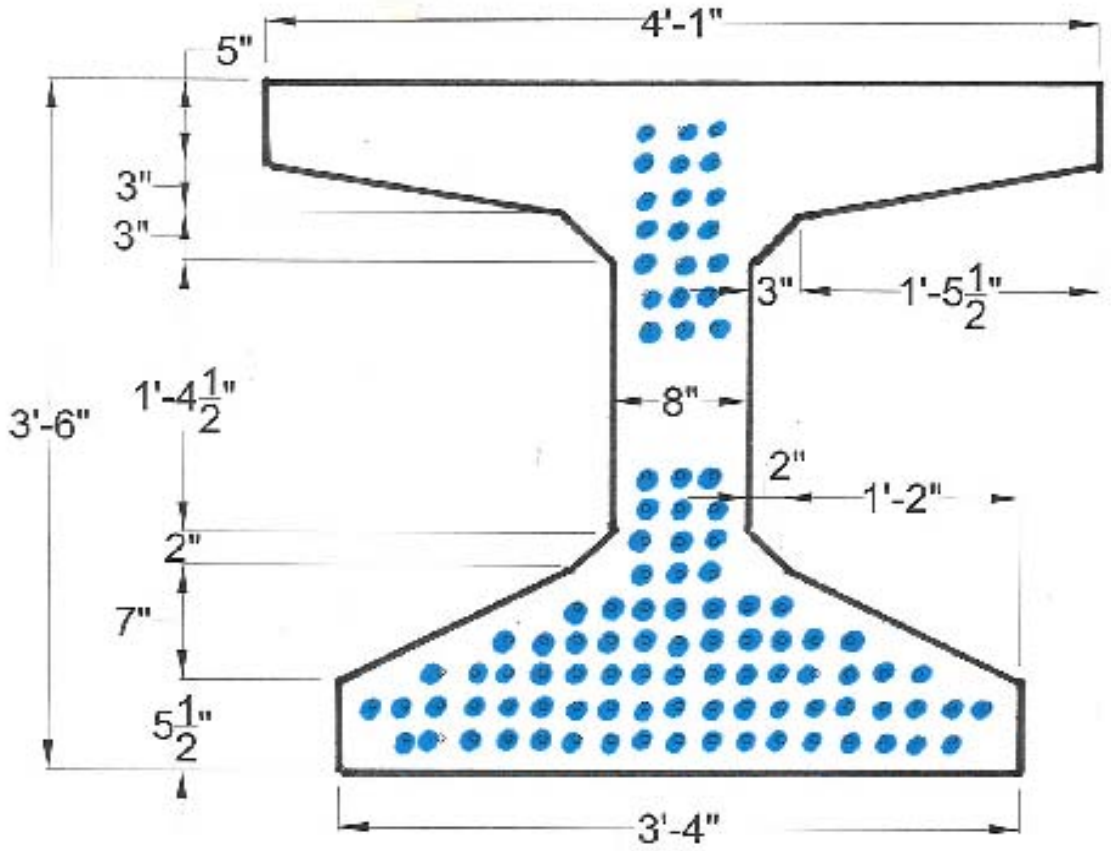


BT 36 x 49

HYBRID BULB-TEE BEAM
TYPE BT 36 X 49

Figure 63-14Y(1)

BT 42 x 49

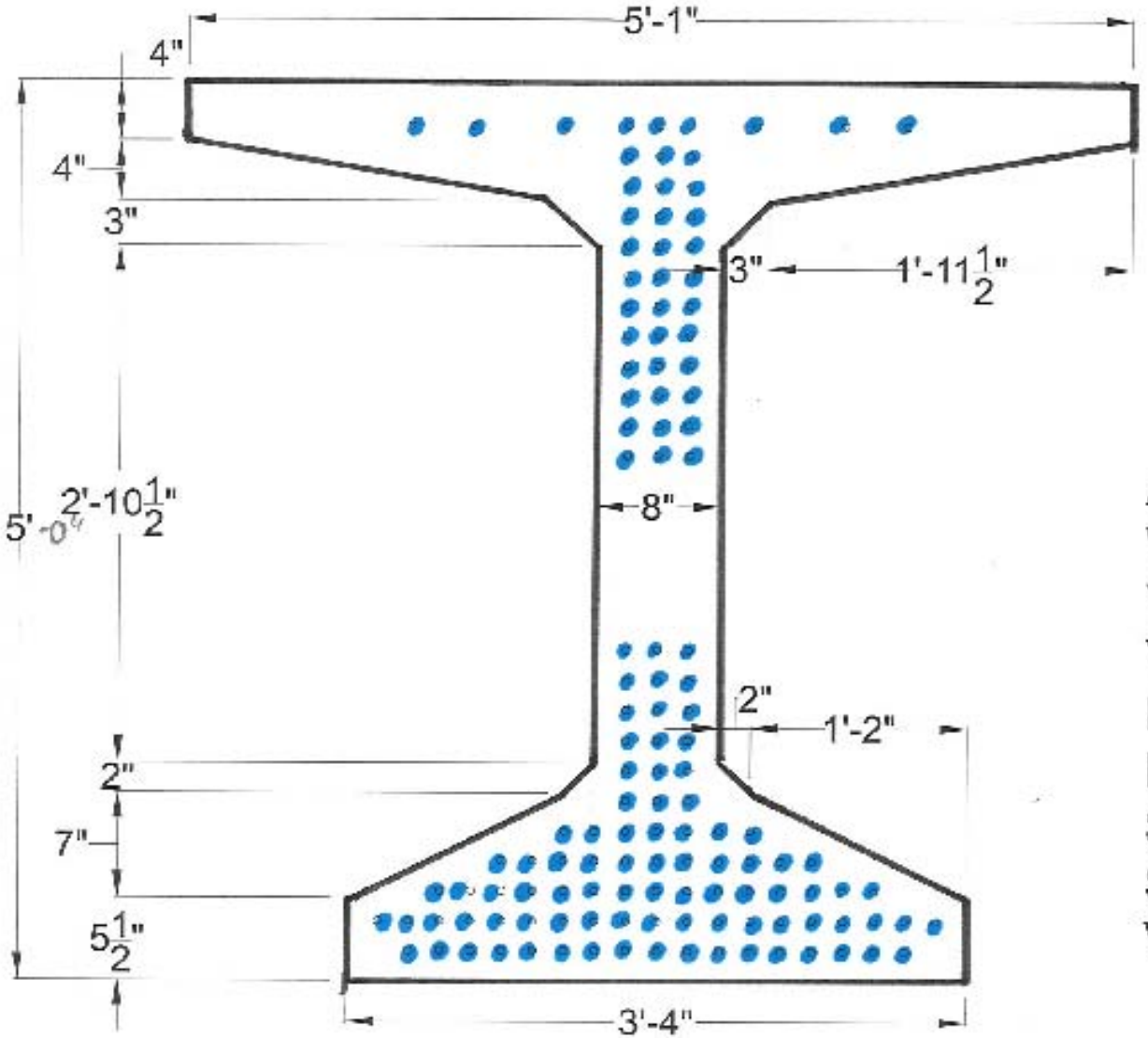


A = 927 sqin
Wt = 965 lb/ft
Yb = 21.09 in
Yt = 20.91 in
Ix = 217705 in^4

Iy = 103176 in^4
Sb = 10323 in^3

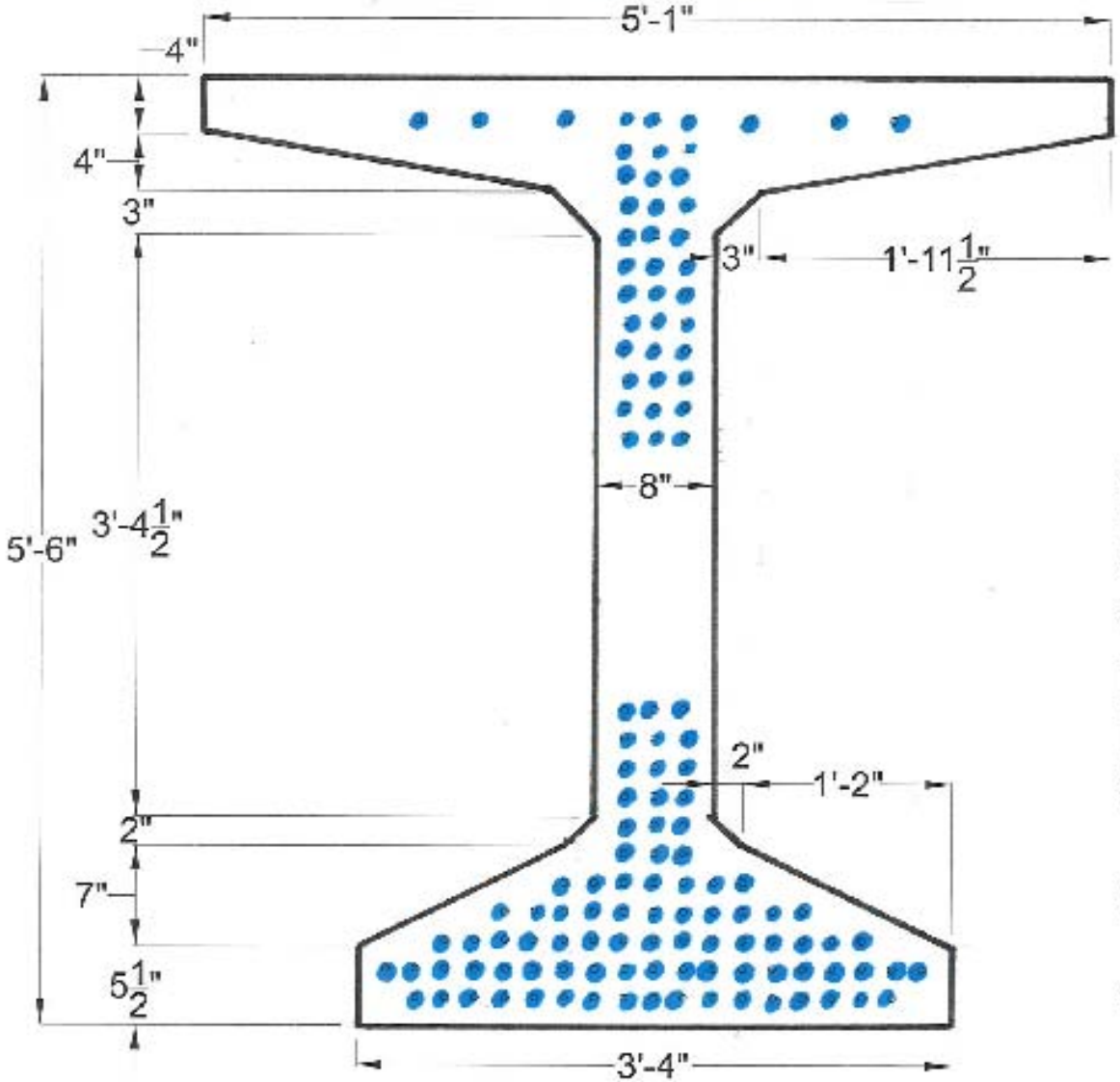
St = 10412 in^3
Vol/Sur = 4.138 in

BT 60 x 61



A = 1125 sqin
Wt = 1172 lb/ft
Yb = 31.24 in
Yt = 28.76 in
Ix = 577017 in^4
Iy = 144703 in^4
Sb = 18470 in^3
St = 20063 in^3
Vol/Sur = 3.988 in

BT 66 x 61



A = 1173 sqin
Wt = 1222 lb/ft
Yb = 34.27 in
Yt = 31.73 in
Ix = 730173 in^4
Iy = 144959 in^4
Sb = 21313.7 in^3

St = 23015.3 in^3

Vol/Sur = 3.988 in

New Bulb-Tee Sections

We are in process with detailing the mild reinforcement on what will be additional Design Manual figures for Part VI, Chap. 63, Prestressed Concrete.

New Bulb-Tee Sections

Once this is complete, we will issue a design memorandum indicating the sections' availability, and use considerations.

New Bulb-Tee Sections

This is expected to be in the spring of 2008.

New Bulb-Tee Sections

- And, yes, the details will be made available in both english and metric units.

THAT'S IT !!

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QUESTIONS

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NO MORE QUESTIONS ?

GOOD !

BREAK TIME !!